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**ABORIGINAL NOVACULITE QUARRIES IN GARLAND  
COUNTY, ARKANSAS.**

BY WILLIAM H. HOLMES.

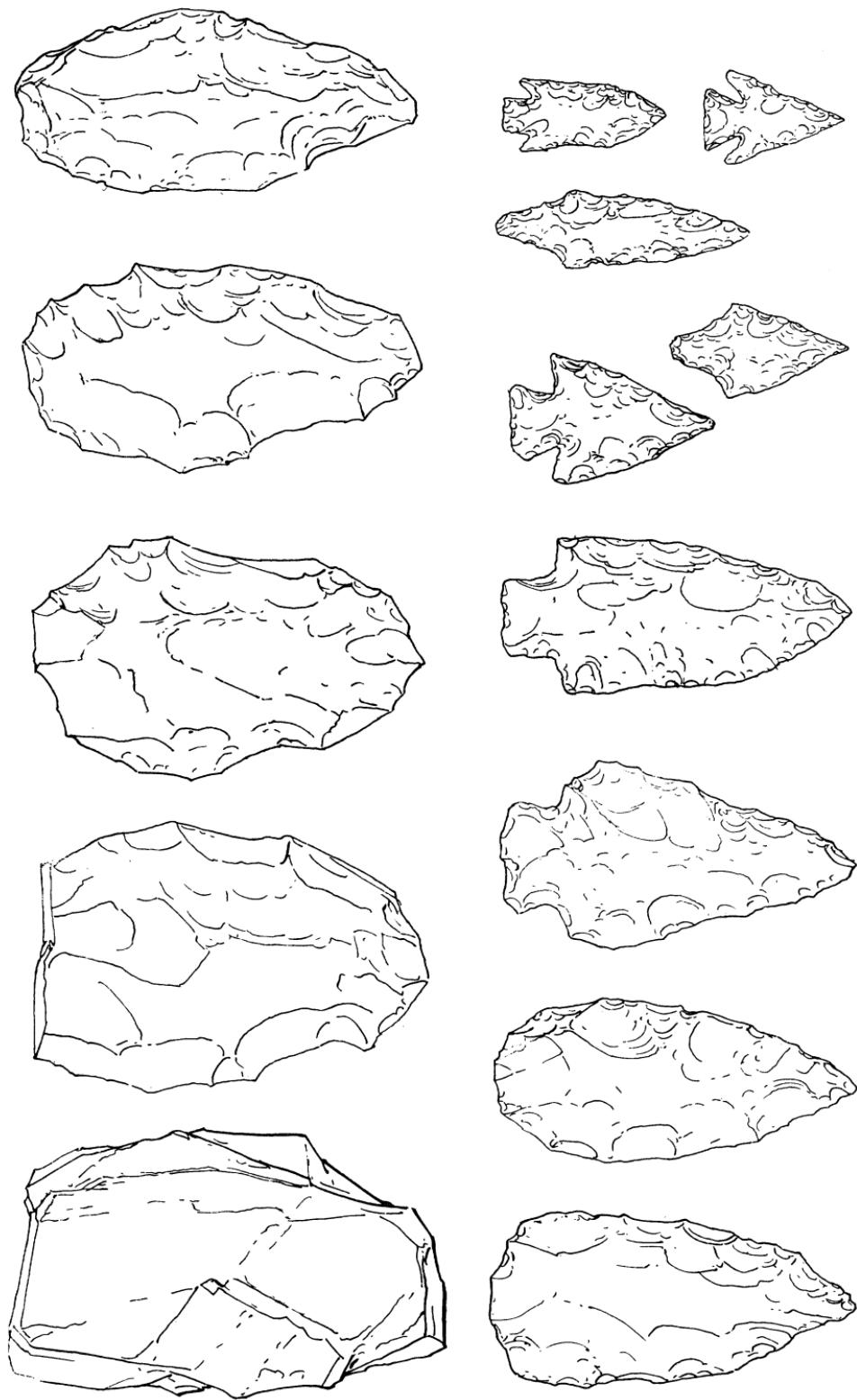
In the State of Arkansas, and extending from near Little Rock to the western limits of the State, is a broad belt of highland made up in great part of a peculiar species of rock known as novaculite. This rock closely resembles chert and flint in character and appearance, but is more attractive to the eye, and on account of its purity and massiveness is more conveniently worked. It occurs in strata, often 50 to 100 feet in thickness, interbedded with silurian slates, sandstones, and quartzites, and outcrops nearly continuously for many miles at a time. Certain varieties of the rock are now extensively quarried for whetstones, as is shown in the report to the 11th Census by Mr. L. S. Griswold, of the Arkansas Geologic Survey. The more flinty or glassy varieties were quarried extensively by the aborigines in past centuries, and employed by them in the manufacture of flaked tools and projectile points and, to a limited extent, of polished tools. The appearance of the rock is most attractive, passing as it does from translucent and milky forms resembling agate into all shades of delicate reds, yellow, grays and blacks. Forming a large share of the exposed rock of the region, erosive agencies have broken it up extensively and have distributed the worn or partially worn fragments over the slopes and along the stream courses. Everywhere the aborigines found and worked these transported masses, and hundreds of square miles are strewn with flakes, fragments, failures and rejected pieces, and the country around, from the mountains to the gulf, is dotted with the finished forms that have been used and lost.

The natives did not stop, however, with the utilization of detached and transported masses. Not finding upon the surface material in suitable quantities, they essayed to quarry it from the hills, and the recently discovered evidences of this work are of unusual interest. The quarries surpass in extent any similar achievements of the aborigines in this country, if not in America.

The quarries are numerous and widespread, but the whole class may be illustrated by a single example, which, though not the most extensive, is unsurpassed in its interest. The example referred to is a group of quarry pits located on the crest of a high forest-covered ridge about three miles east of Hot Springs, Arkansas. The evidences of ancient quarrying consist of a number of pits and excavations dug in and about the crest of the ridge. This ridge is a solid formation of the novaculite weathering out in irregular grayish flinty-looking masses which protrude from the crest or project on the slopes, forming short broken cliffs from ten to twenty feet in height. When we come to realize the true character of these rocks, their slight outcrops, their massiveness and flinty texture, we marvel at the courage of the workman, who with rude stone tools and wooden pikes essayed the work of quarrying; but the beginnings were probably small and the progress of the work so gradual that the workmen did not realize the difficulties that seem so apparent to us.

The largest excavation as seen to-day is on the crest of the narrow ridge near the highest point. It is almost circular and about 150 feet in diameter. The rim of the conical depression is irregular, being higher at the center of the crest of the ridge and lower at the sides. The greatest depth is about 25 feet. On the east side the rim is broken down as a result of the digging of a large pit on that side of the crest. The process of excavating this great conical pit has been, no doubt, about as follows: An outcrop of particularly desirable rock was discovered upon the surface. Gradually it was worked down and followed beneath the surface. The process of uncovering the ledge and breaking up the rock was most tedious; the latter was accomplished by means of hammers, aided by the use of fire. As fragments of suitable size and quality were obtained they were thrown or carried to the margin of the pit, and broken up and trimmed into approximate shape for the desired tools, and the refuse gradually formed heaps and ridges about the excavation. At the present time the enormous accumulations of this refuse have descended upon the interior of the mine, partially filling it, and upon the exterior form slides of broken bits of the richly colored rock, reaching far down the slopes of the ridge. This encircling wall of refuse is composed greatly of partially shaped fragments, all indicating the intention to produce leaf-shaped blanks or blades, suitable for final specialization into spear or arrow points, or knives, scrapers, or like tools. Hundreds of tons of these failures could

PLATE III.—SERIES ILLUSTRATING MANUFACTURE OF NOVACULITE IMPLEMENTS.



be collected, and freely intermingled with them are the rude hammers of quartzite made by slightly reshaping boulders of tough quartzite from the valleys below. This particular pit was entered by the whites in recent years and a shaft was sunk in the center for the purpose of determining whether or not the rocks contained gold or other precious metal, for it was popularly believed that these pits were old Spanish diggings where the early adventurers obtained the fabled gold. It would seem that a very slight experience with the barren flinty novaculite must have discouraged the unlucky prospectors, for little was accomplished. Some of the shaft timbers are still in place in this pit, and the careless observer might readily be led to believe that the excavations were wholly due to modern enterprise. That the recent work has not seriously changed the contour of the ancient quarries is evident from the fact that the entire mass of ejected material, interior and exterior, is composed of the partially shaped fragments derived from ancient flaking.

Connecting partially with the main pit and on the south side is another pit, larger in area, but less regular and not so deep. The symmetry of the basin is interfered with by a series of masses of gnarled rock not removed by the quarrymen. Other smaller excavations occur on the crest north and south of these, and a good deal of work has been done at the sides, especially at a point directly beneath the main pit on the east. Photographs were taken, but fail to give a clear notion of the phenomena of the ancient quarries.

Evidence of the use of fire in quarrying is found in some of these lateral diggings, where there has been undermining. Here certain faces of the novaculite, protected from the weather by overhanging ledges, still retain the blackened patches left by the fires. The freshly quarried rock was carried out of the pits to be worked. High ridges of refuse, marking the favorite positions of the flakers, encircle the pits, but much work was done on all the level spots about the crest of the ridge. The refuse is identical with that of similar sites in other parts of the country. It is like that of the quarries of the District of Columbia, insomuch as it contains no fragments or pieces indicating that more than the merest roughing out was done on the spot. Like the District of Columbia sites, this was in a wild region and some distance from habitable spots.

A series of the quarry shapes is given in the upper line in plate III. The lower line illustrates blades and specialized forms obtained from sites in the neighboring valleys.

Other similar and even more extensive quarries are found at other

points in the novaculite areas. One was visited by Mr. Griswold in 1888 and by Mr. Jenny, of the U. S. Geologic Survey, in 1891. At my suggestion the latter made collections of quartzite hammers and worked pieces of novaculite and forwarded the interesting notes which follow.

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#### **ANCIENT NOVACULITE MINES NEAR MAGNET COVE, HOT SPRINGS COUNTY, ARKANSAS.**

BY W. P. JENNEY.

These old excavations are located on the top of the divide between the waters of Cove creek and Pleasant run, a branch of Ten Mile creek, about twelve miles east of Hot Springs. They consist of a number of shallow excavations upon the broad, rounded crest of the divide, covering a belt three hundred to six hundred feet in width, the workings following the general strike of the novaculite rocks at this point, to wit, N. 60 degrees to 70 degrees E. As far as I followed the divide—for a distance of one and a half miles—these workings continued, and are reported to extend, with breaks at intervals, an extreme distance of four miles southwesterly from this point. They are at present covered with soil and overgrown by oak timber of ordinary size. The excavations are nearly filled by the caving in of the loose waste from the surrounding dumps, but were evidently worked to a depth of fifteen to thirty or forty feet, apparently, as open cuts or trenches, following the purest and most valuable strata of the novaculite. Some are one hundred to three hundred feet in length, but the greater number of these workings consist of shallow pits twenty to fifty feet in length, probably ten to thirty feet in width originally, before caving, and fifteen to twenty-five feet deep, being opened at intervals irregularly along the course of the layers of the novaculite most useful to those doing the work.

The whole ridge is composed of novaculite, with a strike N. 65 degrees E., dipping south at fifty to sixty degrees. Most of the novaculite is coarse-grained, impure, and unsuitable for the manufacture of implements. On the crest of the divide several beds of novaculite outcrop, which are of very fine quality and are interbedded with the coarser strata. These pure beds are from five to twenty-five feet in thickness. The rock is white, yellowish, or bluish white in color, breaking readily with a smooth conchoidal fracture.